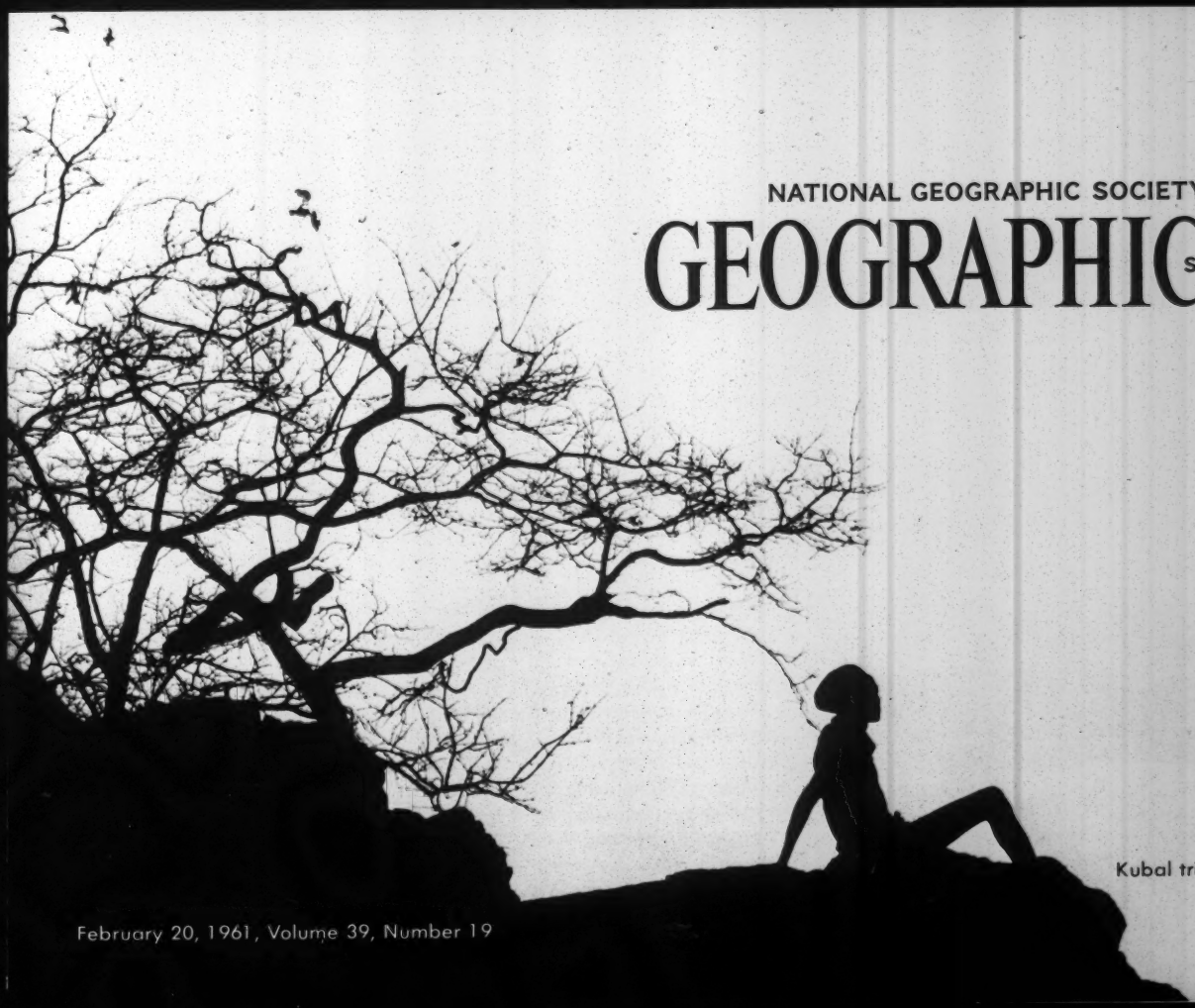

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GEOGRAPHIC SCHOOL BULLETINS

Kubal tribesman finds Mount Tschomulundu
curtained with dust
in Angola's stark southwest

February 20, 1961, Volume 39, Number 19

UMI

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tor, lush tropical forests cover the highlands.

Far to the south stretch rocky deserts like the Moçâmedes at right, where only the ugly, curling leaves of the *Welwitschia mirabilis* interrupt the monotony.

Through the country's grassy midsection graze cattle, sheep, and goats. The Kubal herdsman on the cover, silhouetted against Tschomulundu Mountain, measures his wealth in cattle, even buys his wife with cows.

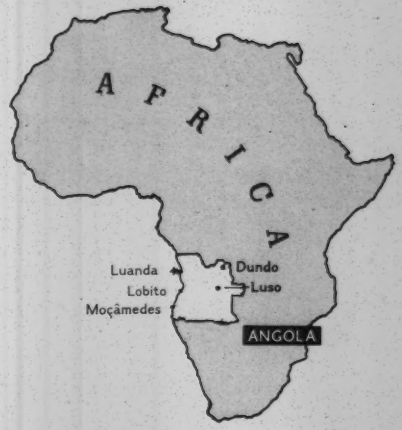
Because of Angola's variety of climates and range in altitudes the land produces diverse crops.

Natives burn off trees and brush to clear space for manioc and corn. Without fertilizers or plows, they soon exhaust the soil and move on. European-owned plantations grow coffee, sisal, sugar cane, cotton, and tobacco.

Bananas, pineapples, guavas, pawpaws thrive nearly everywhere. Wheat, rye, barley, potatoes, rice, peas, and other vegetables are grown on the highlands.

Theoretically Angola shows no discrimination between black and white. Rather, the Portuguese say, they have a culture bar. The Portuguese, who govern Angola as a province of Portugal in the same way that France rules Algeria, discriminate not between black and

Welwitschia mirabilis (above) has no living relatives, grows in the deserts of southwest Africa. It has a life span of more than 100 years. Foot-wide leaves grow 15 feet long, shredding at the ends.



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Angola – Africa's Least Known Land

Photographs by Volkmar Wentzel,
National Geographic Photographer

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IN ANGOLA, Portugal's largest African territory, the bush is always within walking distance. The cities are as Portuguese as Lisbon and the harbors are fitted with giant cranes, docks, warehouses, and grain elevators. But behind them crouches black Africa in all its age-old happiness and misery, vitality and languidness, hope and despair.

The Baluba women at left, near Dundo, paint their faces for a dance as if nothing else mattered. But nearby their Portuguese masters take diamonds from their tribal soil, and across the border in the Republic of the Congo their brothers learn the blessings and almost unbearable burdens of freedom.

As the dancers pick their way through the dense rain forest, right, the drums beat with equatorial intensity, telling of new Africa to the north where *Uhuru* (freedom) has come. But the dance they will do is a humorous mime for tribal amusement. Their costumes of raffia, beaten bark, mud, and pitch represent animals and mythical characters.

On the broad inland savannahs, only a piece of railroad track here, a good road there, the house of a Portuguese trader somewhere else announce the presence of Europeans. Lions raid the wilderness camps of railroad builders, and hippos wallow in cool rivers. Near southern deserts, the Bushmen, conversing in their strange click language (see *School Bulletins,* January 16, 1961), live in dome-shaped huts of branches and leaves.

Angola covers 481,351 square miles, more than 14 times the area of Portugal. But its 4,500,000 people, most of them Africans, would make only about half Portugal's population.

Portugal planted its first settlement here the year before Columbus discovered America. Luanda, the capital, was founded in 1575.

From a narrow, 1,000-mile-long strip of lowland washed by Atlantic waves, Angola rises in steps to cool plateaus averaging 4,000 to 6,000 feet above the sea. In the north, toward the Equa-

homeland. Some 1,500 new housing units a year are not enough to hold the swelling population of Luanda (right). The government has had to resort to a do-it-yourself project. Much like an early American barn-raising, Africans and Portuguese work together to raise a neighbor's home on land rented for as little as $2.65 a year. The city furnishes blueprints, plumbing and water. L.B.

Angola's New Frontier: The South. Where desert once sprawled, stands housing for 5,000 native workers (right). Water from the Catumbela River turned the sun-baked land at Catumbela into a green sugar plantation. Other irrigation works, power projects, harbor modernization, and extended railroad tracks are giving Angola's once-desolate South a new look.

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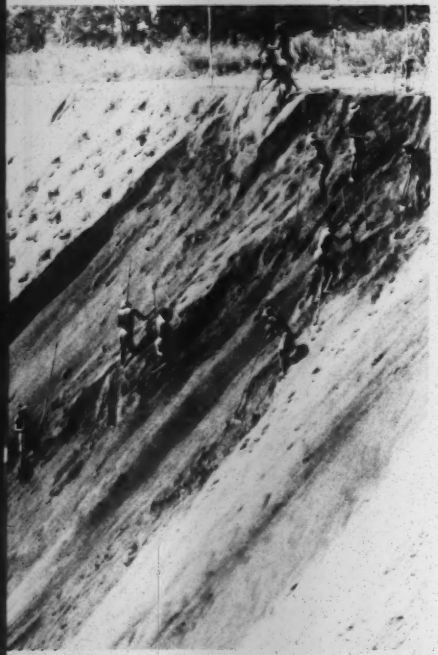

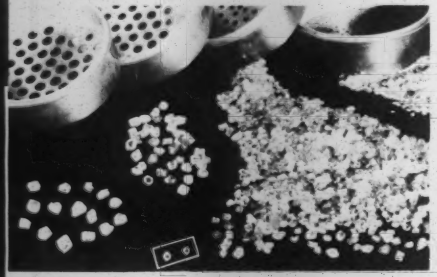

white, but between civilized and uncivilized. The African who learns to speak Portuguese, gives up his pagan religion, and takes a job that allows him to live like a European, becomes civilized and enjoys equal rights with the Portuguese. Few Africans, however, graduate to this class.

So far complaints have been few and violence at a minimum. For the time being Angola labors to develop a potentially rich country whose wealth, like that of many African lands, hides beneath the ground: oil, copper, iron, manganese. Prospectors explore the lonely expanses of the interior in search of new mineral deposits.

In the northeast, great gaping holes in the earth announce the diamond mines. At the left, workers in the Mussolegi mine near Dundo remove overburden to get at diamond-bearing gravel. More than 70,000 bushels of this gravel must be washed to produce one carat of diamond.

In the picture at the bottom, a display of 6,272 carats represents 10 days of production at this mine. The two gems in the rectangle are one carat apiece. About 80 percent of these jewels will be exported to the United States.

Angola's railroads are few, although it does possess part of Africa's only transcontinental line. From Lobito, it threads through Katanga Province of the Republic of the Congo down through the Rhodesias, and ends on the Indian Ocean in Mozambique, the other big Portuguese province in Africa. Above right, a workman inspects a locomotive in a Lobito shop.

Improvement of transportation is now a prime target of the government. Trains are being modernized, tracks extended, and bridges built. Planes fly into new airports; ships dock in newly-modernized harbors. Highways are a crying need.

Portuguese immigration brings more manpower to this big, roomy country. At right, a group disembarks from the Portuguese liner *Ouise* at Lobito. For many the journey will end at Cela, a development 175 miles southeast of Luanda where 125,000 acres of rich soil lie ready for the plow.

Coffee, sisal, and diamonds have turned Luanda into a boom town. Now oil pours prosperity in. Shop windows display Swiss watches, German optical instruments, plastic motorboats, air-conditioners, Italian shoes and motor scooters, and Japanese jeeps.

Housing cannot keep up with the influx of Africans from the interior and Portuguese from the

on valley farmlands each year by the flooding river, so enriched Egyptian soil that it became the foundation of several mighty empires.

But silt brings great problems to dam builders. Muddy water flowing into a quiet lake behind a dam can no longer carry its burden, and dumps its silt. Some reservoirs have been completely filled in, leaving only a stream flowing across the silt deposit and tumbling over the dam.

When a river reaches the sea, it is again slowed, and drops bits of mountains and fragments of farms to form a delta. Over the years, deltas may grow to tremendous size.

The Mississippi, for example, has increased the size of Louisiana by 50 square miles in the last century. On its delta stands the city of New Orleans, right, embraced in loops of the great river.

The Euphrates is filling up the Persian Gulf, which may someday vanish from the maps. Its shoreline retreats some 72 feet a year.

Scientists estimate that erosion would bring all land to near sea level in 6 million years, if it continued its present rate. This smooth earth will never result, however, because there are other forces at work on Earth's crust, pushing up and breaking down.

LEE COX, INDUSTRIAL AERIAL PHOTOS

Barring some major convulsion of Earth's crust, the Ganges River will someday conquer Mount Everest and carry it bit by bit into the Bay of Bengal. But other mountains will take its place. This has happened before—Everest, although the highest mountain in the world, was once a sea bottom. Its rocks were formed from river-born silt and other sediments.

If the remains of Everest are pushed up in some new mountain range, they will again come under the assault of new rivers, and start again their slow journey to the sea.

F.S.

UMI

JACK BREED

The Living River III

THE EARTH SHAPER

IF RIVERS had their way, Earth would be smooth as a billiard ball.

Sometimes it doesn't seem so. In the Grand Canyon, Havasu Creek (left) appears to be making the world rougher. The water cuts down a plateau and will, eventually, erode it entirely into the ocean. The canyon seems eternal only to short-lived man.

Tirelessly rivers scour the land, cutting it down, carrying it away bit by bit to drop it into the sea.

Sometimes the effects are dramatic; sometimes hardly noticeable. Quiet English rivers carry away enough soil to lower the island's land surface a foot in about 13,000 years, it has been estimated.

The waters work on the land in two ways. Chemically, they dissolve rocks—you can see a milky cast to streams that run across limestone. Because of this the oceans are vast treasure houses of chemicals. There is enough gold in seawater, for example, to make every man, woman, and child on earth a millionaire—if it could be gotten out cheaply.

Twice as important as the chemical effect is the mechanical rasping away of bits of material. This can be either carried in suspension in the stream, or dragged along the bottom. A mountain stream in freshet is a tremendously strong mover of rock, able to tumble along boulders up to 30 feet in diameter.

The Po River of Italy illustrates the effect of speed on the river's carrying power. The rapid upper reaches flow over self-made beds of coarse gravel. The stream slows as it reaches a point some 200 miles from the sea, and the bottom becomes sandy. Closer to its mouth, as the Po becomes more sluggish, it drops smaller particles, and flows over fine grained mud.

Material carried in the water is called silt. Every year in the United States rivers throw into the sea some 513,000,000 tons of these tiny chips off the continent. The Mississippi alone, since the days of Lewis and Clark, has borne away about ten cubic miles of North America.

The silt load of the Nile, dropped

PAINTING BY W. LANGDON KIHN. RIGHT, HOWELL WALKER, NATIONAL GEOGRAPHIC STAFF

Hybrid corn came into common use about 1933, and, with further modifications, was responsible for raising yields from about 25 bushels an acre in the early 1930's to about 40 bushels an acre in the 1950's.

Total corn production shot up from about 2.3 billion bushels a year to more than 3 billion in this period.

The hybrid corns, such as that growing at right on a Georgia farm, dwarf the scrawny plants being cultivated by the prehistoric farmer above. They are not the only reason for the increased production, however.

Machines now plant, cultivate, and pick corn. Fertilization and crop rotation help increase the yield-per-acre. New chemicals kill off insect pests.

This abundance of corn has proved something of an embarrassment. The United States is producing more than it can eat or use in manufacturing. The surplus depresses prices, lowering the farmer's income. So the government offers price supports to hold up the price of this (and other) basic commodities.

The government now owns 1.4 billion bushels of corn. In the last fiscal year it cost the taxpayers $160 million just to store this hoard. F.S.

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CHARLES W. HERBERT, WESTERN WAYS

CORN... The Bountiful American

DID YOU EAT up all your 75 pounds of corn last year? That much is what the average American puts away in 12 months—but it is only a fraction of the corn he uses.

Much more corn appears on the table in the shape of bacon and ham—the farmers feed the grain to their pigs. Corn shows up, too, in margarine, ice cream, catsup, chewing gum, jam, puddings, and sirup.

But food does not begin to cover the products of the corn plant. Factories convert it into a wide range of nonedible goods: explosives, antifreeze, ether, paint, paper, paste, photographic film, plastics, soap, synthetic fibers, industrial alcohol, and whisky.

This bountiful crop, the most valuable in the United States, is a native American which has been under cultivation so long that no one has ever found a wild variety.

Apparently corn went through its first great period of development in the Andes of South America, perhaps in southern Peru. Indians cultivated it, and it spread into Central America, where it underwent further changes, then moved throughout North America.

This maize, or Indian corn, was a mainstay of life before the white men came. The Maya Indians lived chiefly on it (see *School Bulletins,* February 13, 1961). Columbus found it under cultivation on his first voyage to the New World.

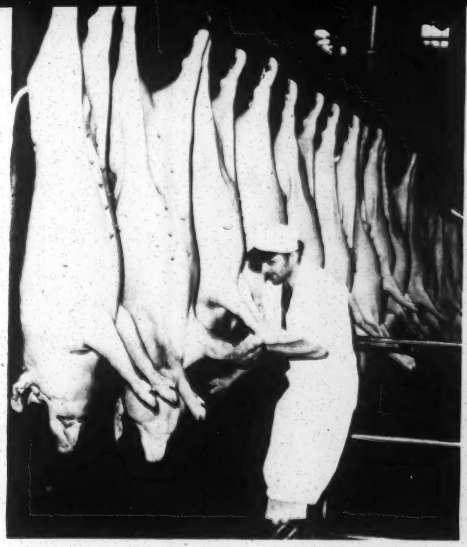
Maize was a staple of the Pueblo Indians, (painting right) and the eastern tribes taught the colonists how to grow it. It was at the close of the first corn harvest at Plymouth Colony that William Bradford set aside a day of thanksgiving, later made a national holiday.

The Indians grew many-colored corn, such as the ears shown at left in a picture taken on the Navajo Indian Reservation. The bounteous plant held a central place in much of Indian religion; the Navajos believed that their ancestors were created from ears of corn.

The American colonists often used it as money, paying rent, taxes, or debts in corn. Inevitably, the plant was introduced in Europe—a development that has led to some confusing language. In Britain, all small cereal grains—including wheat and oats—are collectively known as corn. The grain called corn in the United States is known in England as maize.

Until about 1900, corn grown in the United States was not very much different from some of the strains grown by the Indians. Farmers worked to improve their yield by choosing seed from the best plants. But they could not get uniform results.

In 1905, an American geneticist, George H. Shull, began studying corn. He bred the first hybrids, plants with stronger stalks, bigger ears, and more ears per plant.



changed for the manufactures of the East.

The swamp was filled in, and buildings were lifted out of the mire. Twelve hundred men operating 5,000 jackscrews hoisted the biggest building in town, a hotel, eight feet without breaking a pane of glass.

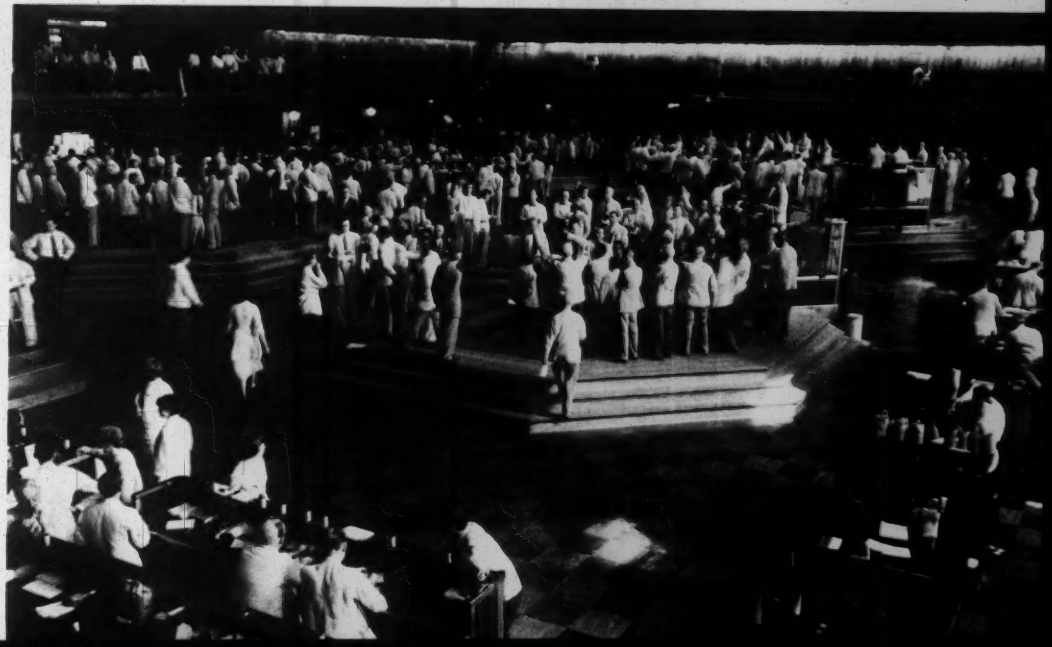
As the wealth of east and west poured in, railroads fanned out to supplement water lanes. Industry dogged commerce's heels. New waterways were added.

The city's stockyards became butchers for the nation. Meat-packing plants rose. Glue and glycerine factories were built to manufacture by-products of the big meat industry.

As railroads focused on this hub, the railroad equipment business moved to Chicago. Steel makers followed. Other manufacturers trailed along.

Together they built Chicago into the nation's second (to New York) city and the world's ninth. Three and a half million people call it home.

They work in its plastics and chemical factories. They dress pork (left) to keep their city one of the world's leading meat-packing centers. Amid the bedlam of the grain pit of the Chicago Board of Trade, below, a flick of the hand buys a crop of corn, wheat, or soya beans. Grain elevators line railroad tracks; building elevators lift office workers in downtown skyscrapers. Refineries take oil from trucks,



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CHICAGO: Titan of Trading Posts

FOR ABOUT A MILLION years the ice sheets, like giant bulldozers, pushed south again and again, shoving soil and rocks before them, gouging out valleys. Some 10,000 years ago, the last glacier retreated, filling lowlands with water and leaving rich black soil in between. The Great Lakes glittered. Grasses of the prairies reached for the sky.

In swamps near the southern end of Lake Michigan, the glaciers built a divide: on one side the waters move toward the Gulf of Mexico; on the other side they course through the lakes to the North Atlantic. This near-linkage of the two river systems is the first great fact of Chicago.

On the trek south from the Bering Strait early man crossed here as he sought hunting grounds to the east. Over the centuries his paths widened into trails. Few chose to live in the muddy crossing place, but all fought for it. Later, as tribes returned to the west, white men's guns at their backs, they sought this spot again. Algonquin, who named it Checagou, yielded to Iroquois, Iroquois to Illinois, Illinois to Miami, Miami to Potawatomi. The trails widened and increased. The Potawatomi held the portage when young Louis Jolliet—church organist, geographer, and explorer—and his companion, Father Jacques Marquette, embarked on their search for a route to the southern sea in 1673. After riding the Mississippi from Wisconsin to the Arkansas River, they paddled back up to the Illinois. From there they steered their bark canoes into the Des Plaines. Carrying their boats across the portage that created Chicago, they launched them into the Chicago River and paddled out into Lake Michigan.

Photographs by B. Anthony Stewart, National Geographic Photographer

Jolliet first dreamed of a canal to connect the lake and rivers. But his dream came to nothing for nearly two centuries. Americans were too busy fighting, first the French and Indians, then the English.

As the eastern seaboard boomed, Chicago remained a frontier outpost on the edge of a swamp. In 1800 a traveler from St. Louis couldn't even find it. In 1833 fewer than 200 people occupied its 43 houses.

Then Congress voted $25,000 to build a harbor here. By mid-century a canal linked the Chicago and Des Plaines Rivers—and thus the Great Lakes and Mississippi—and within a few years the population had grown to 60,000.

Rising in the heart of the great Midwest grain and cattle empire, Chicago became a marketplace where the corn, wheat, livestock, and lumber of the Midwest was ex-

barges, and pipelines. Printers turn out school books, encyclopedias, telephone books, mail-order catalogues—and the *National Geographic*. More steel is made here than in Pittsburgh. Harbor workers handle more freight per year than those on the Panama Canal.

A new canal system—St. Lawrence Seaway—now turns Chicago into an Atlantic port-of-call. Ocean-going freighters steam up the St. Lawrence River, past the rapids that once stopped them, past the ports where once they had to unload their cargo and transfer it to smaller boats, and into the Great Lakes and Chicago's harbor. Chicago's trade routes now stretch around the world.

L.B.

Water and land lanes converge at Chicago. Ships ply the skyscraper-lined Chicago River (above) which cuts through the heart of the city to link, via the Illinois Waterway, the Great Lakes and the Mississippi. With the opening of the St. Lawrence Seaway, the city is spending $500 million on new port facilities.

Beginning in 1848, Chicago became one of the busiest rail centers in the world. At right, the Rock Island Rocket prepares to depart from the La Salle Street Station.

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